ABSTRACT

The invention described herein discloses a chemical mechanical machining and surface finishing process. A conversion coating is formed on the surface of a workpiece and is removed via relative motion with a tool, thereby exposing the workpiece to further reaction with the active chemistry. Low mechanical forces are used such that the plastic deformation, shear strength, tensile strength and/or thermal degradation temperature of the workpiece are not exceeded. Since the chemical mechanical machining and surface finishing process requires little force and/or speed of contact to remove the conversion coating, the equipment's mass, complexity and cost can be significantly reduced, while simultaneously increasing machining precision and accuracy. The present invention lends itself to a very controlled rate of metal removal, and can simply surface finish the workpiece, or if desired, can surface finish the workpiece simultaneously with the shaping and/or sizing process.